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ABSTRACT

The effect of quality circles at Iowa State University on absenteeism, performance evaluation, perceptions of the organization climate, job satisfaction, and perceived opportunities for professional and personal growth was measured in this study. The process of quality circles is designed to promote job fulfillment and organizational productivity through group decision-making. A before/after quasi-experimental design with matched control and treatment groups was employed. The experimental group consisted of purchasing agents, maintenance and custodial workers, and clerical staff who participated in the quality circles. Circle members scored higher than matched controls on quality of work performance, job satisfaction, satisfaction with supervision, and organizational climate. Post hoc ratings of work related dimensions by circle members indicated significant changes in their perceptions of decision-making, teamwork, and communications. Circle members also evidenced significant change in terms of personal growth and development and the acquisition of knowledge and skills. Circles made a difference in employees' perception of their work at the university, but the impact on work performance was less clear. (Author/SW)

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QUALITY CIRCLES IN HIGHER EDUCATION: QUALITY, SATISFACTION, AND CLIMATE

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A Roundtable Discussion Presented at the
AERA Annual Meeting
Washington, D.C.
April, 1987

HE 020 451

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ABSTRACT

Quality Circles in Higher Education: Quality, Satisfaction, and Climate

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The modern American university often measures its success through faculty productivity and student achievement. This is a traditional enough approach with, however, a major limitation. It fails to acknowledge the vast numbers of non academic employees necessary for the effective operation of the institutions, and consequently there is little research which addresses ways in which to enhance the motivation, productivity, personal and work satisfactions of blue and pink collar university employees. Considerable research has demonstrated that increasing the amount of responsibility, autonomy, and variety in jobs often results in substantial improvements in employee work performance and in their satisfaction with the work itself (Katzell, Bienstock, and Faerstein, 1977; Locke, Feren, McCaleb, Shaw, and Denny, 1980). Yet the majority of the studies have examined these consequences in the industrial sector.

Quality Circles, a participatory management technique, was an American export which emerged from post World War II Japan. It is a human resource development tool that provides employees with opportunities for job fulfillment and maximizing organizational productivity through group decision making. The Quality Circles concept is currently under investigation in over 20 major universities in the United States. Participants in the Higher Education quality circles programs are frequently blue and pink collar employees.

This study measured the effect of quality circles (QC) at Iowa State University on absenteeism, performance evaluation, perceptions of the organization climate, job satisfaction, and perceived opportunities for professional and personal growth. The study employed a before/after quasi-experimental design with matched control and treatment groups. Circle members scored higher than matched controls on quality of work performance, satisfaction with their jobs, satisfaction with supervision, and organizational climate. Post hoc ratings of work related dimensions by circle members indicated significant changes in their perceptions ofdecision making, teamwork, and communications. Circle members also evidenced significant change in terms of personal growth and development and the acquisition of knowledge and skills. Clearly, circles did make a difference in employees' perception of their work at Iowa State University, but the impact on work performance was less clear.

INTRODUCTION

In recent years American businesses and industries have adopted the QC concept in order to improve employee communication and product quality. According to Kanter (1984) there is a renewed recognition of the importance of people, and the talents and contributions of individuals, to a company's success. One specific U.S. industry experimenting with quality circles in a limited fashion is American higher education. Although industry relied heavily on competition in production of material goods, and education is a "service" provider interested in goals of enrichment and success, they share the common challenge of providing employees with opportunities for job fulfillment and maximizing organizational productivity. English professors, counselors, custodians, and residence staff share many of the same needs of problem solving and decision making. An obvious question in addressing their needs, however, is whether or not it is possible to translate a process designed for industry into a public education setting. It <u>is</u> possible and the concept has been tried in higher education. For example, a quality circle operating in the College of Business and Public Administration at the University of Missouri - Columbia consisted of a professor and nine teaching assistants (Worley, 1984). The circle rejected a business management lab manual because it included inappropriate activities, was of poor design, and extremely expensive. As an alternative, the circle developed

handouts, case studies, simulations, and training materials for laboratory use. The plan was implemented during the 83-84 academic year. The circle's recommendations resulted in savings to students which amounted to $18,000-$20,000. At Middlesex Community College in New Jersey quality circle techniques were used to provide an inexpensive approach to increasing productivity in the Advisement Center in order to help prepare student tutors for the employment environment (Cohen, 1983).

Quality circles as a human resource development tool were used at the University of Missouri and Middlesex to emphasize the concept of reciprocity of ideas and "people building" for productivity. This concept has characterized Japanese industrial relations since World War II.

Bureaucratic forms of organization and economic constraints have conspired to create levels of frustration among the employees of many colleges and universities. At Iowa State University the quality circle concept has been adapted and has provided involved employees at various levels with a vehicle through which they can have input into institutional activity. In effect, through quality circles, Iowa State University has served as its own learning laboratory, truly upholding its motto, "Science with Practice". In a limited fashion, faculty, administrators, staff, and students have joined together to solve mutually identified problems.

Purpose

The professional literature on quality circles abounds with anecdotes, testimonials and case studies suggesting the success of the concept. Yet a careful analysis reveals few studies adequately measuring the success of QC programs (Luknic, 1984). The purpose of this study was to empirically assess the effects of quality circles at Iowa State University with respect to both objective and affective criteria.

METHODOLOGY

Research Setting and Design

Circle activities were initiated in 1982 in the following departments: Engineering Extension Service, Physical Plant, and Purchasing. Subsequent circles were initiated in the custodial areas, with purchasing clerical workers, and with the grounds crew. This experimental group consisted of "white collar" purchasing agents, "blue collar" maintenance workers and custodians, and "pink collar" clericals. Non-circle members from the same departments served as the control group. Objective criteria measurements for both groups were obtained for the year prior to circle implementation and for the year immediately following. Attitudinal measures were taken immediately before circle activity began and again in 1985. The study thus employed a before/after quasi-experimental design with a matched control group (Campbell and Stanley, 1963).

Procedure

The three objective measures of effectiveness used were absenteeism, work quality, and productivity. These standard

"hard criteria" are commonly used in assessing the impact of organization interventions (Nichols, 1982). They are also frequently included in circle program objectives (Cole and Tachiki, 1984). Absenteeism was measured in terms of total hours of work missed annually by each employee. Measures of performance evaluation were obtained from annual employee performance appraisals. Since the university does not require a standard performance appraisal form, departments participating in this study utilized two different instruments. One instrument consisted of separate scales for quantity and quality of work, each scored by departmental supervisors. The other instrument, a behavioral checklist, was scored as either "meets standards" or "needs improvement." Therefore, a separate analysis of these instruments was necessary.

Attitudinal measures of effectiveness examined in the before/after analysis were job satisfaction and perceived organizational climate. The Job Description Index (JDI) (Smith, Kendall, Hulin, 1969) was used to assess job satisfaction. The scale consisted of five satisfaction dimensions, three of which were used in this study: satisfaction with supervision, co-workers, and the job itself. A twenty-five-item scale of organizational climate (Quality Circle Institute, 1980) served to assess employee perceptions on this criterion.

The final instrument used was an "in house" questionnaire developed specifically to assess dimensions which are most likely

to be influenced by quality circles: the extent to which employees participate in organizational decision making, the extent to which employees work together as a "team", and the amount of vertical and horizontal communication within the department. In addition to these three dimensions, two "individual" dimensions were included: personal growth and development and the acquisition of knowledge and skills. All item responses were in the form of 7-point rating scales, and circle members were requested to rate each item twice; once in regard to their perception prior to QC involvement and again according to their present perceptions. Responses to this scale were thus completely post hoc, departing from the before/after design. Consequently, responses to this questionnaire were treated as change scores in statistical analysis, using a significant departure from zero as the test of significance.

RESULTS

Objective Data

The results of the before/after analysis for circle members and the post experimental/control analysis for the objective criteria are shown in Table 1. There were no significant differences on either *t* test for the absenteeism variable. The before/after *t* test for the experimental group on all measures of performance evaluation were significant at $p < .10$. This nonconservative significance level was employed due to the small

sample resulting from the two performance evaluation instruments used, necessitating the division of the total sample into two groups of 18 and 28 subjects (see (1) and (2) in Table 1).

Table 1

ABSENTEEISM AND PERFORMANCE EVALUATION

		Before/After Experimental			After Experimental/Control		
		N	t	p	N	t	p
	Absenteeism	46	-1.51	(.13)	97	-.47	(.63)
(1)	Productivity	18	1.84	(.08)	31	.97	(.30)
(1)	Quality of Work	18	1.92	(.07)	31	1.76	(.09)
(2)	Performance Appraisal	28	1.68	(.10)	57	.03	(.97)

The post comparison t test between experimental and control groups for quality of work was also significant at $p < .10$.

Attitudinal Data

Table 2 shows the t values and probabilities for the three subscales of the JDI, as well as a composite of the subscales. The experimental group showed a significant increase in satisfaction with supervision after quality circle implementation. Experimental group post scores on satisfaction with work were significantly higher than control scores. Quality circle members' perceptions of organizational climate showed highly significant, positive changes following circle implementation, and were significantly greater than control subjects' perceptions, as shown in Table 2.

Table 2

JOB SATISFACTION AND ORGANIZATIONAL CLIMATE

	Before/After Experimental			After Experimental/Control		
	N	t	p	N	t	p
JDI (Composite)	66/44	1.2	(.22)	86	1.88	(.06)
JDI (Work Itself)	66/44	.33	(.73)	86	3.14	(.002)
JDI (Supervision)	66/44	2.5	(.01)	86	1.69	(.09)
JDI (Co-workers)	66/44	-.56	(.57)	86	-1.16	(.24)
Organizational Climate	66/46	3.5	(.001)	88	4.40	(.0001)

Change scores for circle members on the post hoc questionnaire were significantly different from zero, as shown in Table 3. Circle members evidenced significant improvements on all subscales, as well as the composite, after the advent of circle activities.

Table 3

POST HOC QUESTIONNAIRE
(EXPERIMENTAL GROUP ONLY)

	t	(p)		t	(p)
Decision Making	5.83	(.0001)	Knowledge & Skills	5.85	(.0001)
Communication	3.78	(.0005)	Growth & Development	4.91	(.0001)
Teamwork	4.63	(.0001)	Composite	6.51	(.0001)

DISCUSSION

Objective Criteria

There was an unexpected negative trend in absenteeism for circle members; and the absenteeism rate for control subjects was slightly, though nonsignificantly, lower than that of the experimental group. These findings may, perhaps, be partially attributable to two instances of pregnancy and a case of surgery and extended hospitalization within the experimental group.

There is no incidence reported in the literature in which QC correlated with either pregnancy or surgery!

The performance evaluation results of most interest were for the quality of work dimension on the first performance appraisal instrument. These results indicate that circle members enjoyed higher quality ratings the year after circle implementation. These ratings are congruent with the stated goals of the University's QC program. It should be noted that quality of work persists for circle members in spite of an extremely depressed Iowa economy which has severely limited salary increases. The significant improvements shown by circle members on the other two performance appraisal measures are not as meaningful, as control subjects also showed similar improvements; the post comparisons between experimental and control did not reach significance.

Attitudinal Criteria

The mixed job satisfaction results are somewhat difficult to explain. QC members showed significant increases on only one of the four measures; they were more satisfied with their supervision after circle initiation. Noncircle employees also experienced gains on this dimension, though somewhat less than circle members; experimental post scores were nonsignificantly higher than control scores. Post comparisons showed circle members to be significantly more favorable than non-circle

employees on the satisfaction with work dimension despite an absence of improvement for members' satisfaction over time. Circle members evidenced a slight decrement in satisfaction with their co-workers, one that was not experienced by noncircle members. These results are difficult to interpret, but may reflect tensions that frequently appear when people undertake group efforts to solve work problems.

Results obtained on employee perceptions of organizational climate are certainly gratifying for QC advocates, and should be encouraging for those considering circles as a potential method for improving employee attitudes. Both the before/after and the post implementation analyses revealed very significant findings: experimental subjects' perceptions of organization climate improved dramatically in the year following circle involvement, and were much more favorable than those of noncircle employees. Items on this scale addressed such things as percieved trust, opportunities for involvement, and perceived organizational emphasis on quality of work output - all of which are consistent with the QC concept.

The results for the post hoc questionnaire, though overwhelmingly positive, must be interpreted cautiously. As already noted, administration of this scale departed from the before/after design and scores, therefore, reflect change scores. The use of such scores intensifies several threats to the internal

validity of the findings. The potential confounds of most concern are those resulting from testing (Campbell and Stanley, 1963). Testing, the effect of the pretest on posttest scores, is especially salient in this case since subjects responded to both at the same time. Similarly, such a procedure might also induce changes in respondents' sensitivity or responsiveness to the items, another source of potential bias.

Do quality circles make a difference at Iowa State University? Emphatically, "yes", with respect to the areas of most interest to the Steering Committee and the university administration. These include improved employee work performance and satisfaction with supervision; increased participation in decision making, teamwork activities, and organization communications and improved employee perceptions of their own growth and development and knowledge and skills.

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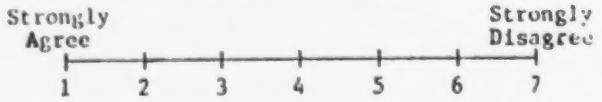
POST HOC QUESTIONNAIRE

1. I can influence the decisions that affect my job.

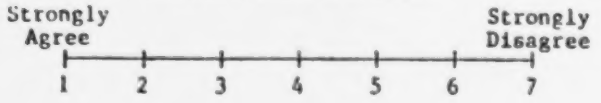
BEFORE QUALITY CIRCLE:

AFTER QUALITY CIRCLE:



2. I have a voice in the changes that are made in my work place.

BEFORE QUALITY CIRCLE:



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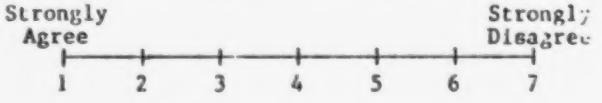
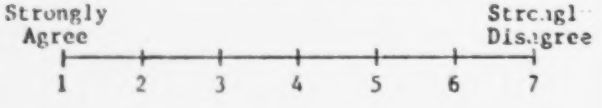


3. I am asked for my ideas.

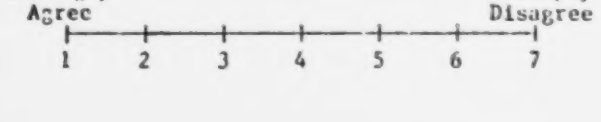
BEFORE QUALITY CIRCLE:

AFTER QUALITY CIRCLE:



4. I communicate frequently with my co-workers.

BEFORE QUALITY CIRCLE:



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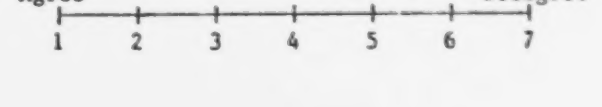
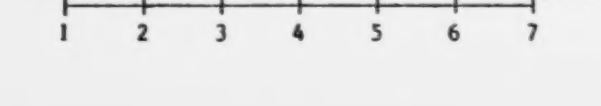


5. I communicate frequently with my supervisors.

BEFORE QUALITY CIRCLE:



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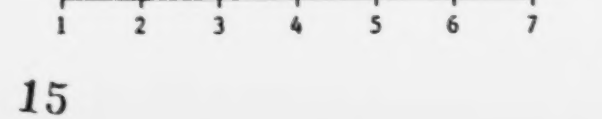
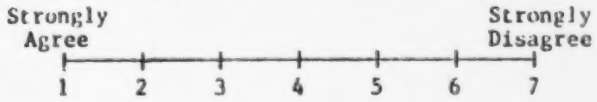


6. People in my work group encourage each other to work together.

BEFORE QUALITY CIRCLE:



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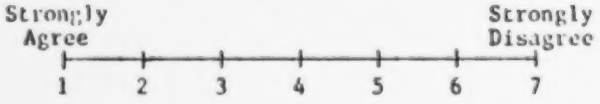
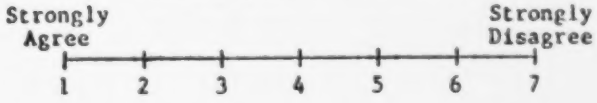


7. I am familiar with the duties and concerns of my co-workers.

BEFORE QUALITY CIRCLE:



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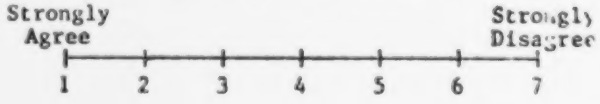
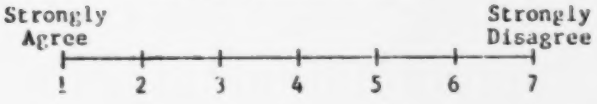


8. I am knowledgeable of departmental goals as projected by management.

BEFORE QUALITY CIRCLE:



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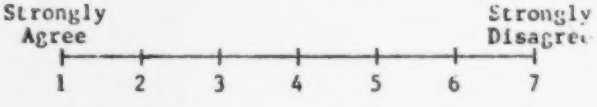


9. I am an active, contributing member of my work group.

BEFORE QUALITY CIRCLE:

AFTER QUALITY CIRCLE:

10. I have the skills necessary to solve work related problems.

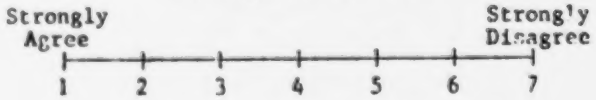
BEFORE QUALITY CIRCLE:

AFTER QUALITY CIRCLE:

11. I present ideas and information confidently to groups.

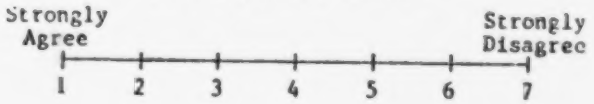
BEFORE QUALITY CIRCLE:

AFTER QUALITY CIRCLE:



12. Members of my work group trust each other.

BEFORE QUALITY CIRCLE:



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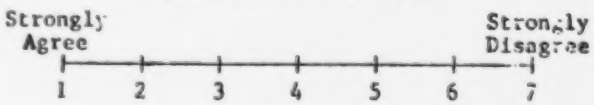
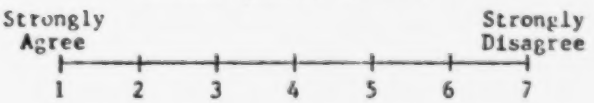


13. There is a great deal of teamwork in my work group.

BEFORE QUALITY CIRCLE:



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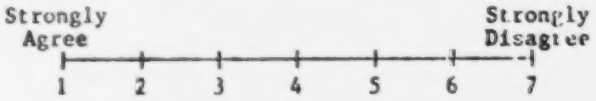
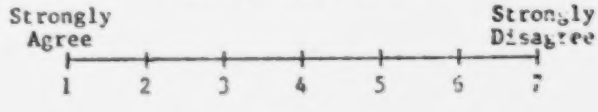


14. I have trouble getting the information I need to do my job well.

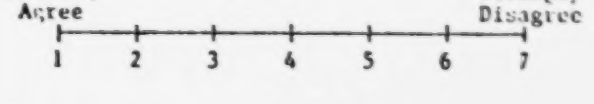
BEFORE QUALITY CIRCLE:

AFTER QUALITY CIRCLE:



15. When participating in group activities, I am not afraid to voice my opinion.

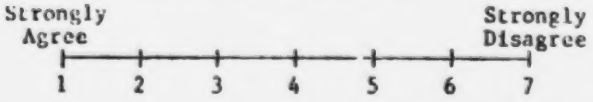
BEFORE QUALITY CIRCLE:



AFTER QUALITY CIRCLE:

16. Quality Circles have been beneficial to my department.

BEFORE QUALITY CIRCLE:



AFTER QUALITY CIRCLE:

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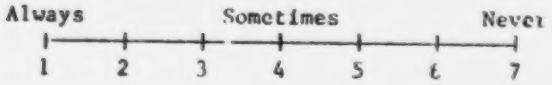
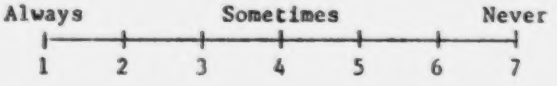
1. I am tolerant of other people and ideas.

BEFORE QUALITY CIRCLE:

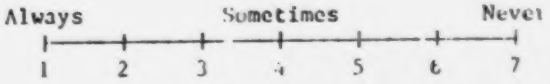


AFTER QUALITY CIRCLE:



2. I am poised in my interactions with others.

BEFORE QUALITY CIRCLE:



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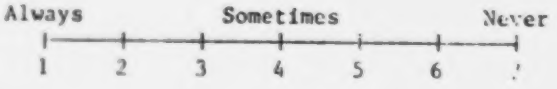
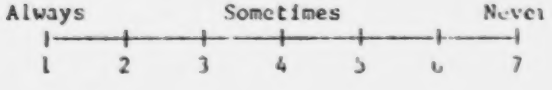


3. I feel a sense of personal accomplishment from my job.

BEFORE QUALITY CIRCLE:



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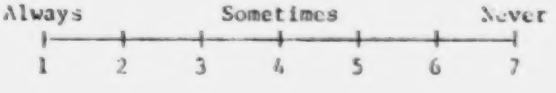
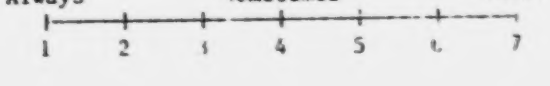


4. I feel confident about my own abilities.

BEFORE QUALITY CIRCLE:



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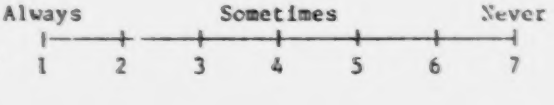
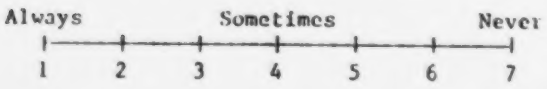


5. I use problem solving skills in my personal life.

BEFORE QUALITY CIRCLE:



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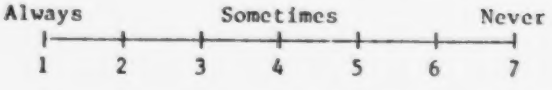
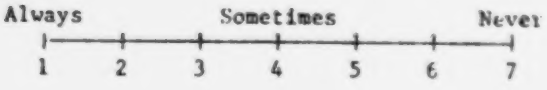


6. I use public speaking skills in my personal life.

BEFORE QUALITY CIRCLE:



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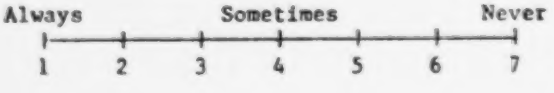

Group Code No. _____

Quality Circle Member Questionnaire

Please check the column which best describes the extent to which you agree or disagree with the following statements. The data will be used to help in the evaluation of our quality circle program. DO NOT sign your name.	Definitely Disagree	Inclined to Disagree	Inclined to Agree	Definitely Agree
1. We can get into trouble by occasionally deviating from standard prescribed practices.				
2. Our department supervisors/administrators are flexible enough that innovations are encouraged and will receive considerations.				
3. Our department has a reputation for high standards.				
4. Our department trusts individual judgment to the point that only rarely is one's work really checked.				
5. Employees take pride in being a member of this department.				
6. Our department subscribes to the philosophy of striving for constant improvement.				
7. Our department supervisors/administrators do a good job of providing recognition for good work.				
8. Employees in our department trust each other.				
9. We are a well-organized group around here.				
10. In our department employees take pride in turning out good work.				
11. Supervisors/Administrators do not expect you to check everything with them. If you clearly know what to do, you can move right ahead.				
12. Our promotion policies are designed to move the best people up. There are no favorites.				
13. People in our department are generally pleasant and friendly.				
14. Our quality and productivity rarely suffer because of poor planning and/or organization.				
15. In our department, supervisors and administrators set challenging goals for us.				
16. In our department, a person can occasionally "take the initiative" without getting into trouble.				
17. Supervisors and administrators reward us fairly according to the excellence of our job performance.				
18. Our department is efficient and well managed.				
19. Our department is expanding because we are not afraid to take appropriate risks when the situation calls for it.				
20. The rewards and encouragement we get are normally greater than the threats and criticism.				
21. Supervisors/Administrators have a close relationship with this department's personnel.				
22. It is clear that supervisors/administrators are anxious to improve performance in this department.				
23. Policies and procedures are followed only when essential.				
24. Our people appear to have considerable loyalty toward this department.				
25. In our department there isn't much criticism of others in the department.				

JDI

In the blank beside each word given below, write

Y for "Yes" if it describes your work
N for "No" if it does NOTE describe it
? if you cannot decide

WORK ON PRESENT JOB	SUPERVISION ON PRESENT JOB	PEOPLE ON YOUR PRESENT JOB
___ Fascinating	___ Asks my advice	___ Stimulating
___ Routine	___ Hard to please	___ Boring
___ Satisfying	___ Impolite	___ Slow
___ Boring	___ Praises good work	___ Ambitious
___ Good	___ Tactful	___ Stupid
___ Creative	___ Influential	___ Responsible
___ Respected	___ Up-to-date	___ Fast
___ Hot	___ Doesn't supervise enough	___ Intelligent
___ Pleasant	___ Quick tempered	___ Easy to make enemies
___ Useful	___ Tells me where I stand	___ Talk too much
___ Tiresome	___ Annoying	___ Smart
___ Healthful	___ Stubborn	___ Lazy
___ Challenging	___ Knows job well	___ Unpleasant
___ On your feet	___ Bad	___ No privacy
___ Frustrating	___ Intelligent	___ Active
___ Simple	___ Leaves me on my own	___ Narrow interests
___ Endless	___ Around when needed	___ Loyal
___ Gives sense of accomplishment	___ Lazy	___ Hard to meet